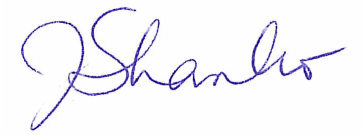
# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **REPORTED TO** | Regional District of Thompson Nicola<br>300 - 465 Victoria Street<br>Kamloops, BC V2C 2A9 | **TEL**<br>**FAX** | (250) 377-6284<br>(250) 374-6489 |
| **ATTENTION** | Shawn Kratchmer | **WORK ORDER** | 7082361 |
| **PO NUMBER** | | **RECEIVED / TEMP** | 2017-08-25 09:10 / 18°C |
| **PROJECT** | Evergreen CWS | **REPORTED** | 2017-09-06 |
| **PROJECT INFO** | | **COC NUMBER** | B50455 |

**General Comments:**

CARO Analytical Services employs methods which are conducted according to procedures accepted by appropriate regulatory agencies, and/or are conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts, except where otherwise agreed to by the client.

The results in this report apply to the samples analyzed in accordance with the Chain of Custody or Sample Requisition document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.



Authorized By: **Jennifer Shanko, A.Sc.T.**
Account Manager

***If you have any questions or concerns, please contact me at jshanko@caro.ca***


**Locations:**

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Richmond, BC V6V 2K9
Tel: 604-279-1499

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Kelowna, BC V1X 5C3
Tel: 250-765-9646

17225 109 Avenue
Edmonton, AB T5S 1H7
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www.caro.ca

# ANALYSIS INFORMATION

| | | | |
|---|---|---|---|
| **REPORTED TO** | Regional District of Thompson Nicola | **WORK ORDER** | 7082361 |
| **PROJECT** | Evergreen CWS | **REPORTED** | 2017-09-06 |

| Analysis Description | Method Reference | Technique | Location |
|---|---|---|---|
| Alkalinity in Water | APHA 2320 B* | Titration with H2SO4 | Kelowna |
| Ammonia, Total in Water | APHA 4500-NH3 G* | Automated Colorimetry (Phenate) | Kelowna |
| Anions by IC in Water | APHA 4110 B | Ion Chromatography with Chemical Suppression of Eluent Conductivity | Kelowna |
| Carbon, Total Organic in Water | APHA 5310 B | High Temperature Combustion, Infrared CO2 Detection | Kelowna |
| Colour, True in Water | APHA 2120 C | Spectrophotometry (456 nm) | Kelowna |
| Conductivity in Water | APHA 2510 B | Conductivity Meter | Kelowna |
| Dissolved Metals by ICPMS in Water | APHA 3030 B / EPA 6020B | 0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS) | Richmond |
| Haloacetic Acids in Water | EPA 552.3* | Liquid-Liquid Microextraction, Derivatization and GC-ECD | Richmond |
| Hardness (as CaCO3) in Water | APHA 2340 B | Calculation: 2.497 [diss Ca] + 4.118 [diss Mg] | N/A |
| Mercury, dissolved by CVAFS in Water | EPA 245.7* | BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS) | Richmond |
| Mercury, total by CVAFS in Water | EPA 245.7* | BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS) | Richmond |
| Solids, Total Dissolved in Water | APHA 2540 C* | Gravimetry (Dried at 103-105C) | Kelowna |
| Total Metals by ICPMS in Water | APHA 3030 E* / EPA 6020B | HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS) | Richmond |
| Transmissivity at 254 nm in Water | APHA 5910 B* | Ultraviolet Absorption | Kelowna |
| Trihalomethanes in Water | EPA 5030B / APHA 6200 B | Purge&Trap / Purge and Trap Capillary Column GC-MSD | Richmond |

***Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method***

**Method Reference Descriptions:**

| | |
|---|---|
| APHA | Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Association/American Water Works Association/Water Environment Federation |
| EPA | United States Environmental Protection Agency Test Methods |

**Glossary of Terms:**

| | |
|---|---|
| MRL | Method Reporting Limit |
| < | Less than the Reported Detection Limit (RDL) - the RDL may be higher than the MRL due to various factors such as dilutions, limited sample volume, high moisture, or interferences |
| AO | Aesthetic objective |
| MAC | Maximum acceptable concentration (health based) |
| OG | Operational guideline (treated water) |
| % T | Percent Transmittance |
| CU | Colour Units (referenced against a platinum cobalt standard) |
| mg/L | Milligrams per litre |
| µS/cm | Microsiemens per centimetre |

**Standards / Guidelines Referenced in this Report:**

Guidelines for Canadian Drinking Water Quality (Feb 2017)

Website: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf

***Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user***

CARO ANALYTICAL SERVICES

# SAMPLE ANALYTICAL DATA

**REPORTED TO** Regional District of Thompson Nicola
**PROJECT** Evergreen CWS

**WORK ORDER** 7082361
**REPORTED** 2017-09-06

| Analyte | Result / *Recovery* | Standard / Guideline | MRL / *Limits* | Units | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|
| **Sample ID: Evergreen CWS - Booster Station (7082361-01) [Water] Sampled: 2017-08-24 09:50** | | | | | | | F1 |
| ***Anions*** | | | | | | | |
| Chloride | **18.2** | AO ≤ 250 | 0.10 | mg/L | N/A | 2017-08-25 | |
| Fluoride | **0.23** | MAC = 1.5 | 0.10 | mg/L | N/A | 2017-08-25 | |
| Nitrate (as N) | **0.644** | MAC = 10 | 0.010 | mg/L | N/A | 2017-08-25 | |
| Nitrite (as N) | < 0.010 | MAC = 1 | 0.010 | mg/L | N/A | 2017-08-25 | |
| Sulfate | **200** | AO ≤ 500 | 1.0 | mg/L | N/A | 2017-08-25 | |
| ***General Parameters*** | | | | | | | |
| Alkalinity, Total (as CaCO3) | **278** | N/A | 1.0 | mg/L | N/A | 2017-08-31 | |
| Alkalinity, Phenolphthalein (as CaCO3) | < 1.0 | N/A | 1.0 | mg/L | N/A | 2017-08-31 | |
| Alkalinity, Bicarbonate (as CaCO3) | **278** | N/A | 1.0 | mg/L | N/A | 2017-08-31 | |
| Alkalinity, Carbonate (as CaCO3) | < 1.0 | N/A | 1.0 | mg/L | N/A | 2017-08-31 | |
| Alkalinity, Hydroxide (as CaCO3) | < 1.0 | N/A | 1.0 | mg/L | N/A | 2017-08-31 | |
| Ammonia, Total (as N) | < 0.020 | N/A | 0.020 | mg/L | N/A | 2017-08-29 | |
| Carbon, Total Organic | **0.79** | N/A | 0.50 | mg/L | N/A | 2017-08-29 | |
| Colour, True | < 5.0 | AO ≤ 15 | 5.0 | CU | N/A | 2017-08-29 | |
| Conductivity (EC) | **942** | N/A | 2.0 | µS/cm | N/A | 2017-08-31 | |
| Solids, Total Dissolved | **616** | AO ≤ 500 | 10 | mg/L | N/A | 2017-08-28 | |
| UV Transmittance @ 254nm | **96.7** | N/A | 0.10 | % T | N/A | 2017-08-28 | |
| ***Calculated Parameters*** | | | | | | | |
| Total Haloacetic Acids (HAA5) | **0.0172** | MAC = 0.08 | 0.00200 | mg/L | N/A | N/A | |
| Total Trihalomethanes | **0.0158** | MAC = 0.1 | 0.00400 | mg/L | N/A | N/A | |
| Hardness, Total (as CaCO3) | **482** | N/A | 0.500 | mg/L | N/A | N/A | |
| Nitrate+Nitrite (as N) | **0.644** | N/A | 0.0200 | mg/L | N/A | N/A | |
| ***Dissolved Metals*** | | | | | | | |
| Aluminum, dissolved | < 0.0050 | N/A | 0.0050 | mg/L | N/A | 2017-09-05 | |
| Antimony, dissolved | **0.00069** | N/A | 0.00020 | mg/L | N/A | 2017-09-05 | |
| Arsenic, dissolved | **0.00098** | N/A | 0.00050 | mg/L | N/A | 2017-09-05 | |
| Barium, dissolved | **0.0205** | N/A | 0.0050 | mg/L | N/A | 2017-09-05 | |
| Beryllium, dissolved | < 0.00010 | N/A | 0.00010 | mg/L | N/A | 2017-09-05 | |
| Bismuth, dissolved | < 0.00010 | N/A | 0.00010 | mg/L | N/A | 2017-09-05 | |
| Boron, dissolved | **0.0473** | N/A | 0.0050 | mg/L | N/A | 2017-09-05 | |
| Cadmium, dissolved | **0.000011** | N/A | 0.000010 | mg/L | N/A | 2017-09-05 | |
| Calcium, dissolved | **73.0** | N/A | 0.20 | mg/L | N/A | 2017-09-05 | |
| Chromium, dissolved | **0.00197** | N/A | 0.00050 | mg/L | N/A | 2017-09-05 | |
| Cobalt, dissolved | < 0.00010 | N/A | 0.00010 | mg/L | N/A | 2017-09-05 | |
| Copper, dissolved | **0.00751** | N/A | 0.00040 | mg/L | N/A | 2017-09-05 | |
| Iron, dissolved | < 0.010 | N/A | 0.010 | mg/L | N/A | 2017-09-05 | |
| Lead, dissolved | **0.00025** | N/A | 0.00020 | mg/L | N/A | 2017-09-05 | |
| Lithium, dissolved | **0.00743** | N/A | 0.00010 | mg/L | N/A | 2017-09-05 | |
| Magnesium, dissolved | **72.9** | N/A | 0.010 | mg/L | N/A | 2017-09-05 | |
| Manganese, dissolved | **0.00021** | N/A | 0.00020 | mg/L | N/A | 2017-09-05 | |
| Mercury, dissolved | < 0.000010 | N/A | 0.000010 | mg/L | 2017-08-30 | 2017-08-30 | |
| Molybdenum, dissolved | **0.00304** | N/A | 0.00010 | mg/L | N/A | 2017-09-05 | |
| Nickel, dissolved | **0.00040** | N/A | 0.00040 | mg/L | N/A | 2017-09-05 | |
| Phosphorus, dissolved | < 0.050 | N/A | 0.050 | mg/L | N/A | 2017-09-05 | |

**REPORTED TO** Regional District of Thompson Nicola
**PROJECT** Evergreen CWS

**WORK ORDER** 7082361
**REPORTED** 2017-09-06

| Analyte | Result / *Recovery* | Standard / Guideline | MRL / *Limits* | Units | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|
| **Sample ID: Evergreen CWS - Booster Station (7082361-01) [Water] Sampled: 2017-08-24 09:50, Continued** | | | | | | | F1 |
| ***Dissolved Metals, Continued*** | | | | | | | |
| Potassium, dissolved | **4.05** | N/A | 0.10 | mg/L | N/A | 2017-09-05 | |
| Selenium, dissolved | **0.00917** | N/A | 0.00050 | mg/L | N/A | 2017-09-05 | |
| Silicon, dissolved | **7.3** | N/A | 1.0 | mg/L | N/A | 2017-09-05 | |
| Silver, dissolved | < 0.000050 | N/A | 0.000050 | mg/L | N/A | 2017-09-05 | |
| Sodium, dissolved | **43.8** | N/A | 0.10 | mg/L | N/A | 2017-09-05 | |
| Strontium, dissolved | **0.589** | N/A | 0.0010 | mg/L | N/A | 2017-09-05 | |
| Sulfur, dissolved | **76.4** | N/A | 3.0 | mg/L | N/A | 2017-09-05 | |
| Tellurium, dissolved | < 0.00050 | N/A | 0.00050 | mg/L | N/A | 2017-09-05 | |
| Thallium, dissolved | < 0.000020 | N/A | 0.000020 | mg/L | N/A | 2017-09-05 | |
| Thorium, dissolved | < 0.00010 | N/A | 0.00010 | mg/L | N/A | 2017-09-05 | |
| Tin, dissolved | **0.00026** | N/A | 0.00020 | mg/L | N/A | 2017-09-05 | |
| Titanium, dissolved | < 0.0050 | N/A | 0.0050 | mg/L | N/A | 2017-09-05 | |
| Uranium, dissolved | **0.0106** | N/A | 0.000020 | mg/L | N/A | 2017-09-05 | |
| Vanadium, dissolved | **0.0014** | N/A | 0.0010 | mg/L | N/A | 2017-09-05 | |
| Zinc, dissolved | **0.0064** | N/A | 0.0040 | mg/L | N/A | 2017-09-05 | |
| Zirconium, dissolved | < 0.00010 | N/A | 0.00010 | mg/L | N/A | 2017-09-05 | |
| ***Total Metals*** | | | | | | | |
| Aluminum, total | **0.669** | OG < 0.1 | 0.0050 | mg/L | 2017-09-01 | 2017-09-01 | |
| Antimony, total | **0.00125** | MAC = 0.006 | 0.00020 | mg/L | 2017-09-01 | 2017-09-01 | |
| Arsenic, total | **0.00083** | MAC = 0.01 | 0.00050 | mg/L | 2017-09-01 | 2017-09-01 | |
| Barium, total | **0.0257** | MAC = 1 | 0.0050 | mg/L | 2017-09-01 | 2017-09-01 | |
| Beryllium, total | < 0.00010 | N/A | 0.00010 | mg/L | 2017-09-01 | 2017-09-01 | |
| Bismuth, total | **0.00018** | N/A | 0.00010 | mg/L | 2017-09-01 | 2017-09-01 | |
| Boron, total | **0.0510** | MAC = 5 | 0.0050 | mg/L | 2017-09-01 | 2017-09-01 | |
| Cadmium, total | **0.000012** | MAC = 0.005 | 0.000010 | mg/L | 2017-09-01 | 2017-09-01 | |
| Calcium, total | **70.2** | N/A | 0.20 | mg/L | 2017-09-01 | 2017-09-01 | |
| Chromium, total | **0.00457** | MAC = 0.05 | 0.00050 | mg/L | 2017-09-01 | 2017-09-01 | |
| Cobalt, total | **0.00052** | N/A | 0.00010 | mg/L | 2017-09-01 | 2017-09-01 | |
| Copper, total | **0.0639** | AO ≤ 1 | 0.00040 | mg/L | 2017-09-01 | 2017-09-01 | |
| Iron, total | **1.10** | AO ≤ 0.3 | 0.010 | mg/L | 2017-09-01 | 2017-09-01 | |
| Lead, total | **0.0204** | MAC = 0.01 | 0.00020 | mg/L | 2017-09-01 | 2017-09-01 | |
| Lithium, total | **0.00922** | N/A | 0.00010 | mg/L | 2017-09-01 | 2017-09-01 | |
| Magnesium, total | **72.6** | N/A | 0.010 | mg/L | 2017-09-01 | 2017-09-01 | |
| Manganese, total | **0.0204** | AO ≤ 0.05 | 0.00020 | mg/L | 2017-09-01 | 2017-09-01 | |
| Mercury, total | < 0.000010 | MAC = 0.001 | 0.000010 | mg/L | 2017-08-30 | 2017-08-30 | |
| Molybdenum, total | **0.00299** | N/A | 0.00010 | mg/L | 2017-09-01 | 2017-09-01 | |
| Nickel, total | **0.00216** | N/A | 0.00040 | mg/L | 2017-09-01 | 2017-09-01 | |
| Phosphorus, total | < 0.050 | N/A | 0.050 | mg/L | 2017-09-01 | 2017-09-01 | |
| Potassium, total | **4.33** | N/A | 0.10 | mg/L | 2017-09-01 | 2017-09-01 | |
| Selenium, total | **0.00954** | MAC = 0.05 | 0.00050 | mg/L | 2017-09-01 | 2017-09-01 | |
| Silicon, total | **8.7** | N/A | 1.0 | mg/L | 2017-09-01 | 2017-09-01 | |
| Silver, total | < 0.000050 | N/A | 0.000050 | mg/L | 2017-09-01 | 2017-09-01 | |
| Sodium, total | **44.2** | AO ≤ 200 | 0.10 | mg/L | 2017-09-01 | 2017-09-01 | |
| Strontium, total | **0.591** | N/A | 0.0010 | mg/L | 2017-09-01 | 2017-09-01 | |

| | | | |
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| **PROJECT** | Evergreen CWS | **REPORTED** | 2017-09-06 |

| Analyte | Result / *Recovery* | Standard / Guideline | MRL / *Limits* | Units | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|
| **Sample ID: Evergreen CWS - Booster Station (7082361-01) [Water] Sampled: 2017-08-24 09:50, Continued** | | | | | | | F1 |
| ***Total Metals, Continued*** | | | | | | | |
| Sulfur, total | **78.5** | N/A | 3.0 | mg/L | 2017-09-01 | 2017-09-01 | |
| Tellurium, total | < 0.00050 | N/A | 0.00050 | mg/L | 2017-09-01 | 2017-09-01 | |
| Thallium, total | < 0.000020 | N/A | 0.000020 | mg/L | 2017-09-01 | 2017-09-01 | |
| Thorium, total | < 0.00010 | N/A | 0.00010 | mg/L | 2017-09-01 | 2017-09-01 | |
| Tin, total | **0.0303** | N/A | 0.00020 | mg/L | 2017-09-01 | 2017-09-01 | |
| Titanium, total | **0.0705** | N/A | 0.0050 | mg/L | 2017-09-01 | 2017-09-01 | |
| Uranium, total | **0.0113** | MAC = 0.02 | 0.000020 | mg/L | 2017-09-01 | 2017-09-01 | |
| Vanadium, total | **0.0025** | N/A | 0.0010 | mg/L | 2017-09-01 | 2017-09-01 | |
| Zinc, total | **0.0194** | AO ≤ 5 | 0.0040 | mg/L | 2017-09-01 | 2017-09-01 | |
| Zirconium, total | < 0.00010 | N/A | 0.00010 | mg/L | 2017-09-01 | 2017-09-01 | |
| ***Haloacetic Acids*** | | | | | | | S03 |
| Monochloroacetic Acid | < 0.0020 | N/A | 0.0020 | mg/L | 2017-08-31 | 2017-08-31 | |
| Monobromoacetic Acid | < 0.0020 | N/A | 0.0020 | mg/L | 2017-08-31 | 2017-08-31 | |
| Dichloroacetic Acid | **0.0109** | N/A | 0.0020 | mg/L | 2017-08-31 | 2017-08-31 | |
| Trichloroacetic Acid | **0.0063** | N/A | 0.0020 | mg/L | 2017-08-31 | 2017-08-31 | |
| Dibromoacetic Acid | < 0.0020 | N/A | 0.0020 | mg/L | 2017-08-31 | 2017-08-31 | |
| *Surrogate: 2-Bromopropionic Acid* | *138* | | *70-130* | % | *2017-08-31* | *2017-08-31* | |
| ***Volatile Organic Compounds (VOC)*** | | | | | | | |
| Bromodichloromethane | **0.0050** | N/A | 0.0010 | mg/L | N/A | 2017-08-29 | |
| Bromoform | < 0.0010 | N/A | 0.0010 | mg/L | N/A | 2017-08-29 | |
| Chloroform | **0.0083** | N/A | 0.0010 | mg/L | N/A | 2017-08-29 | |
| Dibromochloromethane | **0.0025** | N/A | 0.0010 | mg/L | N/A | 2017-08-29 | |
| *Surrogate: Toluene-d8* | *95* | | *70-130* | % | *N/A* | *2017-08-29* | |
| *Surrogate: 4-Bromofluorobenzene* | *98* | | *70-130* | % | *N/A* | *2017-08-29* | |

**Sample / Analysis Qualifiers:**

F1 The sample was not field-filtered and was therefore filtered through a 0.45 µm membrane in the laboratory and preserved with HNO3 prior to analysis for dissolved metals.

S03 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.